

# **EXHIBIT 'A'**

**IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF PENNSYLVANIA**

KHS CORP., a Delaware Corporation,	)	
individually and as the representative	)	
of a class of similarly-situated persons,	)	
	)	
Plaintiff,	)	No. 16-55
	)	
v.	)	Judge Anita B. Brody
	)	
SINGER FINANCIAL	)	Magistrate Judge David R. Strawbridge
CORPORATION, PAUL SINGER, and	)	
JOHN DOES 1-12,,	)	
	)	
Defendants.	)	

**PLAINTIFF'S EXPERT WITNESS DISCLOSURE**

Plaintiff, KHS Corp. ("Plaintiff"), in accordance with Fed. R. Civ. P. 26(a)(2) and the Court's Second Amended Scheduling Order (ECF 70), makes the following disclosure of expert witness:

1. Plaintiff hereby discloses C. Lee Howard as a retained expert whom it may present at trial.
2. A copy of Mr. Howard's report is attached as Exhibit 1.
3. A copy of Mr. Howard's curriculum vitae is attached as Exhibit 2.
4. Mr. Howard is paid at a rate of \$400 per hour.
5. Mr. Howard's report may be supplemented or refined in light of additional discovery and deposition testimony as he reviews it.

Dated: July 7, 2017                      Respectfully submitted,

/s/ Jonathan B. Piper

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# EXHIBIT 1

4 May 2017

My name is Lee Howard. I am not a party to this matter. I have worked since before 2001 as a fax consultant for many companies in deploying computer-based faxing services for their businesses. I am a developer of fax software. I have designed and developed fax applications as well as a software modem. I have been called upon as an expert witness in other TCPA cases. Due to my experience and qualifications I have been hired by Bock, Hatch, Lewis & Oppenheim, LLC to consult with them and analyze computer data regarding this case, KHS v Singer.

## CONSULTATION

On 12 January 2017 Jonathan B. Piper, Esq., of Bock, Hatch, Lewis & Oppenheim contacted me and asked that I identify what data would be necessary to examine from an ActiveFax computer software installation in order to determine its past activity. Also, I was asked to identify a computer service provider in the area of Philadelphia, Pennsylvania that could reliably copy ActiveFax data from one or more systems at Singer Financial.

Consequently, after a brief internet search and phone conversation with persons at TeamLogic IT in Philadelphia, I advised Mr. Piper that TeamLogic IT would be able to do the necessary work and that the data that should be copied would be the entire ActiveFax sub-directory in the Windows "Program Files" directory and to ensure that the "Server\Faxlist" directory was included and contained files. Mr. Piper informed me that one of the plaintiff's fax phone numbers was 215-947-8388 and that the plaintiff claimed faxes were received from Singer Financial on 12 August 2015, 20 August 2015, and 24 November 2015.

On 1 February 2017 I was involved in phone calls with Bill Meyer, an employee of TeamLogic IT, who went on-site to Singer Financial in order to obtain a copy of the ActiveFax data. On this first visit Mr. Meyer was not permitted by Singer Financial to copy data from the Singer Financial fax server. However, Mr. Meyer was permitted to take photographs of some screens that contained ActiveFax filename and directory information.

Mr. Meyer subsequently provided those photographs to me, and they are provided in this report as Exhibit A. These photographs show that the ActiveFax sub-directory in the Windows "Program Files" directory was stored as "G:\Program Files\ActiveFax" and that the "Server\Faxlist" directory was present and contained directories and files named "20150812\00000042.001" (dated 12 August 2015), "20150820\00000043.001" (dated 11 September 2015), "20151124\0000004c.001" (dated 24 November 2015), and "20151124\0000004d.001" (also dated 24 November 2015).

It is important to note that Mr. Meyer was accessing the hard drive from a different system. Therefore, the "drive letter" of "G:" that is shown in the photographs is not representative of the drive letter that would have been used for that filesystem if the drive were being used as it normally would in its original equipment. (Normally I would expect the "drive letter" to be "c:" or "d:".)

On 13 April 2017 Mr. Meyer returned to Singer Financial and also communicated with me via phone as he had done before. He informed me that the "Server\Faxlist" directory was now missing. Consequently, I instructed Mr. Meyer to try to obtain a byte-by-byte copy of the computer's entire hard

drive and send that to me so that I could attempt data recovery techniques to recover any files that had been deleted. Mr. Meyer was subsequently able to create that copy. I have included Mr. Meyer's report as Exhibit A1.

## DATA RECOVERY AND DELETION ANALYSIS

On 21 April 2017 I received a hard drive shipped to me by Mr. Meyer. The hard drive I received is branded "Seagate NAS HDD 4000 GB" with serial number Z300WX3B (hereinafter referred to as "the hard drive"). It has a hand-written label on it, "KHS v Singer copied drive". I understand that this is a copy of the Singer Financial hard drive from their fax server.

I connected the hard drive to a test system in my office. This test system runs the Fedora Linux operating system. I used the test system to run software known as "testdisk" which can be used to undelete files from computer filesystems. A truncated log from the testdisk software is provided as Exhibit B. (I truncated this log for the sake of brevity, as the full log is extremely long. One line marked with bold shows that the hard drive's serial number matches the one on the label. Other lines marked as bold will be referred to later.) I instructed testdisk to attempt to recover all deleted files and store them on a separate filesystem. This provided me copies of all deleted files as best as could be provided through the testdisk software.

From a user's perspective, deleting files on Windows is typically a two-part process. First, files or folders (also known as directories) are placed into the "Recycle Bin". Second, the "Recycle Bin" is emptied at some later point.

From the perspective of the filesystem, several things happen as files and folders are placed into the "Recycle Bin" and then when that "Recycle Bin" is emptied. First, when files are placed into the "Recycle Bin" Windows creates an information file on the filesystem in "`\$Recycle.Bin\<SID>\$I<ID>.<EXT>`" where `<SID>` is a unique security identifier for the user logged-into the system, `<ID>` is a random string generated by Windows, and `<EXT>` is the filename extension on the original file. Windows moves the original file into the "`\$Recycle.Bin\<SID>\`" directory and renames it "`\$R<ID>.<EXT>`" where `<ID>` and `<EXT>` match those of the information file. In the information file Windows stores the original filename (and path), the deletion date and time, and some other information. The manner of extracting that information from the information file can be found in multiple places on-line. I used the instructions found in Exhibit C.

When the "Recycle Bin" is emptied both the information file and the renamed original file are deleted. For the purposes of this report, it may be important to understand that files on computer filesystems are merely defined portions of data on the storage media. In the case of this Windows system, each file's location on the storage media and its size are stored in a special file called the "master file table" (MFT). When a file is deleted the only change is in the MFT to indicate that the media space previously used by that file is now unused and available for other files. The media space is not erased or zeroed-out, and the MFT still contains information regarding the deleted file. Consequently, it is possible to recover deleted files from such filesystems, especially when the media space used by those files does not get reused afterwards.

After running testdisk I used the Fedora Linux system tools to mount the hard drive's primary filesystem. This provided me access to all of the files which had not been deleted.

95 On the mounted filesystem I found the “Program Files/ActiveFax” directory (slashes between directory names are reverse on Linux from Windows). I noted that the “Program Files/ActiveFax/Server/Faxlist” directory was, indeed, missing as Mr. Meyer had noted during his second on-site visit to Singer Financial. Furthermore, I found two files, “\$IAB86J8.001” and “\$RAB86J8.001” on the mounted filesystem in the “\$Recycle.Bin/S-1-5-21-1123632922-864520165-2211449252-1001/” directory. This pair of files in “\$Recycle.Bin” represent a file that has been put into the “Recycle Bin” but has not yet been emptied from the “Recycle Bin”. By using the instructions in Exhibit C the following information is determined about the original file:

```
105 # strings -el -f $IAB86J8.001
$IAB86J8.001: G:\Program Files\ActiveFax\Server\Faxlist\20150609\00000038.001
```

Date bits extracted from the information file using a hex editor: 80 A5 58 12 89 80 D2 01

```
110 # echo $((0x01d280891258a580))
131308665353840000
# echo $((131308665353840000/10000000))
13130866535
# echo $((13130866535-11644473600))
1486392935
115 # date -d @1486392935
Mon Feb 6 09:55:35 EST 2017
```

Therefore, “\$RAB86J8.001” was originally named “G:\Program Files\ActiveFax\Server\Faxlist\20150609\00000038.001” and was placed into the “Recycle Bin” on Monday, 6 February 2017 at 9:55AM (time provided by the system clock) by the user represented by security ID “S-1-5-21-1123632922-864520165-2211449252-1001”.

From this information I know that the “G:\Program Files\ActiveFax\Server\Faxlist” directory was present on the system on 6 February 2017, which would corroborate Mr. Meyer's findings in Exhibit A five days earlier.

It is significant to point out that the drive letter, “G:” in the data extracted from the information file indicates that when the “00000038.001” file was moved to the “Recycle Bin” the hard drive was not being used in its original system. Instead, as with the case in Mr. Meyer's work, it was connected to separate equipment. (I'll review this in more detail, later.)

Looking at the files recovered by testdisk, I noted the following files:

```
135 $RSBG9/20140701/00000003.001
$RSBG9/20140724/00000005.001
$RSBG9/20140915/00000008.001
$RSBG9/20141003/0000000b.001
$RSBG9/20141208/00000014.001
$RSBG9/20141227/00000015.001
140 $RSBG9/20150206/0000001a.001
$RSBG9/20150213/0000001b.001
$RSBG9/20150306/0000001d.001
```

```

$RSBGSQ9/20150404/00000032.001
$RSBGSQ9/20150430/00000034.001
145 $RSBGSQ9/20150507/00000035.001
$RSBGSQ9/20150524/00000036.001
$RSBGSQ9/20150610/00000039.001
$RSBGSQ9/20150612/0000003a.001
$RSBGSQ9/20150612/0000003b.001
150 $RSBGSQ9/20150613/0000003c.001
$RSBGSQ9/20150705/0000003d.001
$RSBGSQ9/20150705/0000003e.001
$RSBGSQ9/20150714/0000003f.001
$RSBGSQ9/20150730/00000040.001
155 $RSBGSQ9/20150812/00000042.001
$RSBGSQ9/20150820/00000043.001
$RSBGSQ9/20150904/00000044.001
$RSBGSQ9/20150904/00000045.001
$RSBGSQ9/20150911/00000046.001
160 $RSBGSQ9/20150914/00000047.001
$RSBGSQ9/20150918/00000048.001
$RSBGSQ9/20150923/00000049.001
$RSBGSQ9/20151027/0000004a.001
$RSBGSQ9/20151030/0000004b.001
165 $RSBGSQ9/20151124/0000004c.001
$RSBGSQ9/20151124/0000004d.001
$RSBGSQ9/20160118/0000004e.001
$RSBGSQ9/20160203/0000004f.001
$RSBGSQ9/20160205/00000051.001
170 $RSBGSQ9/20160219/00000053.001
$RSBGSQ9/20160505/00000055.001
$RSBGSQ9/20160506/00000056.001
$RSBGSQ9/20160506/00000057.001
$RSBGSQ9/20160506/00000058.001
175 $RSBGSQ9/20160506/00000059.001
$RSBGSQ9/20160506/0000005a.001
$RSBGSQ9/20160506/0000005b.001
$RSBGSQ9/20160506/0000005c.001
$RSBGSQ9/20160506/0000005d.001
180 $RSBGSQ9/20160506/0000005e.001
$RSBGSQ9/20160527/0000005f.001
$RSBGSQ9/20160527/00000060.001
$RSBGSQ9/20160527/00000061.001
$RSBGSQ9/20160613/00000062.001
185 $RSBGSQ9/20160622/00000063.001
$RSBGSQ9/20160623/00000064.001
$RSBGSQ9/20161005/00000065.001
/$Recycle.Bin/S-1-5-21-1123632922-864520165-2211449252-1001/$ISBGSQ9

```

190 Examining “\$ISBGSQ9” following the instructions in Exhibit C reveals:

```

# strings -el -f \"$ISBGSQ9
$ISBGSQ9: G:\Program Files\ActiveFax\Server\Faxlist

```

195 Date bits extracted from the information file using a hex editor: 20 EA E3 5F 8A 80 D2 01



```
# echo $((0x01d2808a5fe3ea20))
131308670949780000
# echo $((131308670949780000/10000000))
13130867094
# echo $((13130867094-11644473600))
1486393494
# date -d @1486393494
Mon Feb 6 10:04:54 EST 2017
```

Therefore, “\$RSBGSQ9” was originally named “G:\Program Files\ActiveFax\Server\Faxlist”, and it was placed into the “Recycle Bin” on Monday, 6 February 2017 at 10:04AM (time provided by the system clock) by the same user as above, represented by security ID “s-1-5-21-1123632922-864520165-2211449252-1001”.

Again, I will note that the drive letter being used for the filesystem was “G:” when the “Faxlist” folder was moved to the “Recycle Bin”. This tells me that at the time the “Faxlist” folder was moved to the “Recycle Bin” that the hard drive was not connected to the original equipment. To verify that this was the case I examined the Windows system registry files using software called “Forensic Registry EDitor” (or “fred”). I used fred to examine the Windows system registry file “\Windows\System32\config\SYSTEM” and looked at the “MountedDevices” node and “\DosDevices\G:” key. The value stored in that registry key, shown in Exhibit D, confirms that on the original equipment the drive letter “G:” corresponds to a USB storage device (flash drive) by Lexar.

Mr. Meyer observed that the hard drive in the Singer Financial equipment was a Seagate Barracuda 320GB drive with serial number 9VM5D6PH. Because this is a different device from what the Windows registry indicates corresponded to drive letter “G:” on the original equipment, and because the “Recycle Bin” information files indicated that the files and folder were deleted from “G:” I can reliably conclude that the hard drive was connected to different equipment when those files and folder were moved to the “Recycle Bin” on Monday, 6 February 2017.

That conclusion also helps explain why the user security ID “s-1-5-21-1123632922-864520165-2211449252-1001” is not found in the system registry. Examination of the Windows system registry file “\Windows\System32\config\SOFTWARE” under the “Microsoft\Windows NT\ProfileList” node (Exhibit E) does not reveal any user with that security ID. Furthermore, none of the profiles show a “last modification time” (indicating the last time the user logged-into the system) of later than 20 January 2017, which preceded the time of Mr. Meyer's first site visit (before the files were deleted).

Therefore, I reliably conclude that the “ActiveFax\Server\Faxlist” folder and sub-folders and files within that folder were moved to the “Recycle Bin” on Monday, 6 February 2017, from 9:55AM to 10:05AM Eastern time. This was done as the hard drive was connected to equipment other than the original system. Following that operation, these files were then emptied from the “Recycle Bin” (deleted). The identity of the person who performed that operation could possibly be determined by locating a Windows system with a user having security ID “s-1-5-21-1123632922-864520165-2211449252-1001”.

Also in the “Recycle Bin” were two other files, “\$I15M1XR.pst” and “\$R15M1XR.pst” both in the “\ \$Recycle.Bin\S-1-5-21-57346706-462366255-786342593-1000\” directory. Following the

instructions in Exhibit C reveals:

```
# strings -el -f \I15M1XR.pst
$I15M1XR.pst: C:\Users\John\Documents\backup - contacts -11-6-2015.pst
```

Date bits extracted from the information file using a hex editor: 50 0F 80 24 3C 73 D2 01

```
# echo $((0x01d2733c24800f50))
131294041294770000
# echo $((131294041294770000/100000000))
13129404129
# echo $((13129404129-11644473600))
1484930529
# date -d @1484930529
Fri Jan 20 11:42:09 EST 2017
```

260 By referring to Exhibit E I can see that security ID “S-1-5-21-57346706-462366255-786342593-1000” refers to the system user “John”. Therefore, someone who was logged-into the system as user “John” moved the “C:\Users\John\Documents\backup – contacts -11-6-2015.pst” file into the “Recycle Bin” on Friday, 20 January 2017 at 11:42AM.

265 I used two different software tools, one called “readpst” and another called “vcf2csv” in order to read this file and convert it into a CSV file which can then be read by common software (such as Microsoft Excel or LibreOffice Calc). In doing so I could see that the PST file contained five different contact lists which were named “17 Ravine -brokers (This computer only)”, “Contacts (This computer only)”, “Only-fax (This computer only)”, “Banks-10-27-2015 (This computer only)”, and “MTG Brokers-10-270 30-2015 (This computer only)”. These five lists are given in Exhibit H (duplicate entries within the same list have been removed).

Included in Exhibit H are also three other lists which were found as CSV files in the “\Users\John\Desktop” directory: “5-18-2016 Pauls Database.csv”, “5-6-16 Total Database For 275 Kville.csv”, and “Dentists\_Medical Offices.csv”.

#### FAX DATA ANALYSIS

280 After the data recovery was complete, the original “Program Files\ActiveFax” directory was reconstructed by restoring the “Faxlist” directory under “Program Files\ActiveFax\Server” and restoring the various recovered sub-directories and files underneath the “Faxlist” directory. Following instructions provided by the ActiveFax software developers (Exhibit F) I copied the entire “Program Files\ActiveFax” directory to an entirely different system for use there. This would allow me to run ActiveFax without altering the files or data on the original copy from the hard drive.

285 By running the ActiveFax server software copied from the hard drive and going to the “Help” and then “About ActiveFax...” selection the ActiveFax Server software is identified as “Version 4.25, Build 0221”. The same dialogue shows that it is licensed to “Paul Singer” with “S/N: 36D3Q-100JY-AZ10B-7S23X”. (See Exhibit G.)

290 ActiveFax Server software records two related sets of activity logs. The first set of activity logs is

known as the “Faxlist” and each entry is given a unique “Fax-ID” number. The second set of activity logs is known as “Transmission Protocol” and each entry is given a unique “Protocol-ID” number. The “Faxlist” entries are each separate fax jobs given to ActiveFax Server to communicate a document with another fax system. The “Transmission Protocol” entries are each a separate fax call. Due to busy signals, no answer conditions, and other transmission failures, multiple “Protocol-IDs” may be linked to a single “Fax-ID”.

Within the main “Faxlist” panel and by iterating through each container in the “Fax-Status Selection Window” the individual “Faxlist” for each container can be found and exported as a CSV file. By clicking “Extras” on the main ActiveFax Server menu and choosing “Transmission Protocol...” a window and dialogue opens that allows for transmission protocol logs to be exported as a CSV file.

By running the ActiveFax server software I was able to extract all of the available transaction log information that was available on the system. Also available were copies of some faxed images. The ActiveFax Server software makes it trivial to “delete” Faxlist items (which process first moves them to an ActiveFax “Recycle Bin” - different from the Windows “Recycle Bin”). When the “Recycle Bin” is emptied then the Faxlist items are permanently deleted. However, the Transmission Protocol logs are more cumbersome to remove because they require the user to have an awareness that they are there as they largely stay hidden from view. So, it is not unexpected that there are Faxlist and fax image data missing that are referenced by the Transmission Protocol logs.

As this case is primarily concerned about the sending of unsolicited fax advertisements, I will only briefly summarize the incoming fax traffic (received faxes) logged by the system. The system does not appear to have been used regularly for receiving faxes as there are only six received faxes stored on the system: one on 6 March 2015 at 16:26 (Exhibit I; which, itself, seems to be an unsolicited fax advertisement), one on 12 June 2015 at 12:15 (Exhibit J), one on 12 June 2015 at 12:23 (Exhibit K), one on 30 July 2015 at 11:09 (Exhibit L), one on 14 September 2015 at 17:52 (Exhibit M), and one on 24 November 2015 at 08:37 (Exhibit N; which, also, seems to be an unsolicited fax advertisement).

Similarly, I will only briefly summarize outgoing fax traffic (sent faxes) logged by the system which were not part of a broadcast of fax advertising. The system Faxlist logs only indicate two such instances: one on 30 April 2015 (Exhibit O, a test fax) and another on 7 May 2015 (Exhibit P, which is payment for telephone services, possibly the fax line services). Sent faxes which do not appear in the Faxlist but do appear in the Transmission Protocol logs and are only sent to an individual destination are also concluded to not be part of fax advertising and are ignored. (Such instances are two faxes on 26 March 2015 sent to fax number 6318440178 - named “20150326165026324.pdf”, a fax sent on 30 March 2015 to 215-925-8597 – named “20150330110029048.pdf”, a fax sent on 30 March 2015 to 215-535-0703 – named “20150330110136398.pdf”, and so forth.) It is significant to note that all outbound fax traffic that was not part of fax advertising was sent to individual recipients; there were no broadcasts of documents to multiple recipients that were not advertisements.

Also, there are numerous fax jobs submitted to the system which never were completed or were canceled before their successful delivery. I will, likewise, only mention that these exist as they do not appear to be of necessary interest in this case.

Some logs appear to have been deleted and were not recovered through testdisk. There is evidence (in the form of active outgoing fax jobs) of two broadcasts being initiated after 22 June 2016 (23 June

2016 and 5 October 2016) but for which there are no records (neither in the “Faxlist” nor in the  
 340 “Transmission Protocol”) of any successful transmissions.

The ActiveFax activity logs indicate that all faxes transacted through the COM4 serial port. In looking  
 at the Windows system registry (Windows\System32\config\SYSTEM) using fred and looking at node  
 path \ControlSet001\Control\Class\{4D36E96D-E325-11CE-BFC1-08002BE10318} I see that  
 345 although there is an internal “LSI PCI-SV92EX Soft Modem” present to the system (on COM3),  
 COM4 corresponds to a Conexant “USB Data Fax Voice Modem” which was likely installed on 4 June  
 2014. (See Exhibit Q.)

The following paragraphs each describe a separate fax broadcast of fax advertising conducted on the  
 350 Singer Financial ActiveFax system. I have named the broadcasts based on the range of the Fax-ID  
 numbers and the date that the broadcast was initiated. For each broadcast I provide the dates and times  
 in which it was conducted, the matching Exhibit which was used as the image for that broadcast  
 transmission, a count of the number of successful transmissions in that broadcast, and a matching  
 Exhibit detailing each of the recipients of a successful transmission in that broadcast.

355 Some recipients received more than one separate transmission of some broadcasts at the same fax  
 number. This occurs because there are duplicate entries in the fax number lists being used by Singer  
 Financial. In such cases the faxes will have different Fax-ID and Protocol-ID numbers. However,  
 duplication also occurs because sometimes the broadcasts were at least in part resubmitted to  
 360 ActiveFax. In these cases the faxes will have the same Fax-ID number but different ion Protocol-ID  
 numbers.

**Fax00000001-00000166-20140624:** This broadcast occurred from 24 June 2014 1:18PM until 25 June  
 2014 10:51AM. The image is no longer found on the system, but was named “Accountant\_New1.pub”  
 365 and may be the same as Fax00021548-00024244-20150404 based on that name. It was successfully  
 transmitted to 133 recipients (Exhibit R).

**Fax00000169-00000722-20140625:** This broadcast occurred from 25 June 2014 5:41PM until 30 June  
 2014 9:22PM. The image is no longer found on the system, but was named “Brokers - Lenders  
 370 Down.pub” and may be the same as Fax00010018-00010571-20141208 or Fax00047640-00048211-  
 20151030 because they are named identically. It was successfully transmitted to 303 recipients  
 (Exhibit S).

**Fax00000728-00001211-20140701:** This broadcast occurred from 1 July 2014 6:29PM until 21 July  
 375 2014 9:58PM. The image was named “8 x 10 in. (1)”, is an advertisement, and is shown in Exhibit T.  
 It was successfully transmitted to 268 recipients (Exhibit U).

**Fax00001285-00001450-20140722:** This broadcast occurred from 22 July 2014 5:52PM until 23 July  
 2014 8:31PM. The image is no longer found on the system, but was named “Accountant \_ New.pub”  
 380 and may be the same as Fax00021548-00024244-20150404 based on that name. It was successfully  
 transmitted to 134 recipients (Exhibit V).

**Fax00001453-00002006-20140724:** This broadcast occurred from 24 July 2014 5:39PM until 4  
 September 2014 5:44PM. The image is no longer found on the system but was named “8 x 10 in. (1)”.  
 385 It was successfully transmitted to 323 recipients (Exhibit W). (The name “8 x 10in. (1)” likely

originated from a setting in the initial print-to-fax process and does not necessarily indicate an identical image as other faxes with the same image name.)

390 **Fax00002010-00002731-20140828:** This broadcast occurred from 28 August 2014 5:52PM until 13 September 2014 9:15PM. The image is no longer found on the system, but was named “Microsoft Word - Loans - Aug 2014”. It was successfully transmitted 559 times to recipients (Exhibit X).

395 **Fax00002737-00003290-20140915:** This broadcast occurred from 15 September 2014 11:58PM until 2 October 2014 8:06PM. The image was named “Brokers - got equity.pub”, is an advertisement, and is shown in Exhibit Y. It was successfully transmitted to 321 recipients (Exhibit Z).

400 **Fax00004414-00004967-20141003:** This broadcast occurred from 3 October 2014 6:16PM until 30 October 2014 5:30PM. The image was unnamed, is an advertisement, and is shown in Exhibit AA. It was successfully transmitted to 322 recipients (Exhibit AB).

**Fax00004973-00005094-20141030:** This broadcast occurred from 30 October 2014 6:34PM until 11 November 2014 9:10AM. The image was named “Brokers - got equity.pub”, is an advertisement, and is shown in Exhibit Y. It was successfully transmitted to 69 recipients (Exhibit AC).

405 **Fax00006089-00006140-20141112:** This broadcast occurred from 12 November 2014 6:00PM until 12 November 2014 7:52PM. The image is no longer found on the system, but was named “Full page photo”. It was successfully transmitted to 39 recipients (Exhibit AD). (The name “Full page photo” likely originated from a setting in the initial print-to-fax process and does not necessarily indicate an identical image as other faxes with the same image name.)

410 **Fax00006142-00006194-20141117:** This broadcast occurred from 17 November 2014 6:03PM until 17 November 2014 7:26PM. The image is no longer found on the system, but was named “Bank – dispose.pub”. It was successfully transmitted to 39 recipients (Exhibit AE).

415 **Fax00006196-00006361-20141119:** This broadcast occurred from 19 November 2014 4:24PM until 19 November 2014 8:34PM. The image is no longer found on the system, but was named “Accountant \_ New.pub” and may be the same as Fax00021548-00024244-20150404 based on that name. It was successfully transmitted to 130 recipients (Exhibit AF).

420 **Fax00006362-00006905-20141121:** This broadcast occurred from 21 November 2014 5:35PM until 25 November 2014 1:36PM. The image is no longer found on the system, but was named “handshake.pdf”. Based on that name it is possible that it was similar to the image for Fax00039083-00041984-20150820. It was successfully transmitted to 312 recipients (Exhibit AG).

425 **Fax00006974-00009725-20141126:** This broadcast occurred from 26 November 2014 6:00PM until 7 December 2014 10:53PM. The image is no longer found on the system, but was named “Full page photo”. It was successfully transmitted to 1946 recipients (Exhibit AH).

430 **Fax00010018-00010571-20141208:** This broadcast occurred from 8 December 2014 6:56PM until 13 December 2014 2:53PM. The image was named “Brokers - Lenders Down.pub”, is an advertisement, and is shown in Exhibit AI. It was successfully transmitted to 317 recipients (Exhibit AJ).



435 **Fax00010577-00011130-20141227:** This broadcast occurred from 27 December 2014 1:30PM until 30 December 2014 10:55PM. The image was named “brokers - Christmas.pub”, is an advertisement, and is shown in Exhibit AK. It was successfully transmitted to 311 recipients (Exhibit AL).

440 **Fax00011134-00011299-20150122:** This broadcast occurred from 22 January 2015 12:24PM until 25 January 2015 9:37PM. The image is no longer found on the system but was named “Full page photo”. It was successfully transmitted to 118 recipients (Exhibit AM).

445 **Fax00011302-00011855-20150122:** This broadcast occurred from 22 January 2015 9:19PM until 28 January 2015 1:53AM. The image is no longer found on the system, but was named “Bank - foreclosure.pub”. It was successfully transmitted to 263 recipients (Exhibit AN).

**Fax00011859-00012024-20150128:** This broadcast occurred from 28 January 2015 5:59PM until 5 February 2015 7:46PM. The image is no longer found on the system but was named “Full page photo”. It was successfully transmitted to 122 recipients (Exhibit AO).

450 **Fax00012027-00012580-20150129:** This broadcast occurred from 29 January 2015 7:09PM until 6 February 2015 5:40AM. The image was named “Brokers - got equity.pub”, is an advertisement, and is shown in Exhibit Y. It was successfully transmitted to 267 recipients (Exhibit AP).

455 **Fax00012585-00012868-20150206:** This broadcast occurred from 6 February 2015 6:34PM until 23 February 2015 12:18AM. The image was named “Full page photo”, is an advertisement, and is shown in Exhibit AQ. It was successfully transmitted to 226 recipients (Exhibit AR).

460 **Fax00012869-00015908-20150213:** This broadcast occurred from 13 February 2015 7:53PM until 28 February 2015 6:00PM. The image was named “Lending Now.pub”, is an advertisement, and is shown in Exhibit AS. It was successfully transmitted to 1964 recipients (Exhibit AT).

465 **Fax00015913-00016679-20150304:** This broadcast occurred from 4 March 2015 5:55PM until 12 March 2015 4:26AM. The image was named “Brokers - got equity.pub”, is an advertisement, and is shown in Exhibit Y. It was successfully transmitted to 371 recipients (Exhibit AU).

470 **Fax00016681-00016846-20150313:** This broadcast occurred from 13 March 2015 6:11PM until 21 March 2015 8:41PM. The image is no longer found on the system, but was named “Money Available Now” and is likely to be the same as Fax00024248-00026108-20150524 based on the matching name. It was successfully transmitted to 139 recipients (Exhibit AV).

**Fax00016847-00017131-20150313:** This broadcast occurred from 13 March 2015 10:42PM until 23 March 2015 7:24PM. The image is no longer found on the system but was named “Full page photo”. It was successfully transmitted to 242 recipients (Exhibit AW).

475 **Fax00017134-00017900-20150317:** This broadcast occurred from 17 March 2015 8:26PM until 24 March 2015 8:15AM. The image is no longer found on the system but was named “Tax Problems - No problems” and is likely the same as Fax00027231-00027396-20150610 (based on the unique name matching the text in the image). It was successfully transmitted to 368 recipients (Exhibit AX).

480

**Fax00017901-00019808-20150324:** This broadcast occurred from 24 March 2015 8:18AM until 28 March 2015 9:43AM. The image is no longer found on the system but was named, "Full page photo". It was successfully transmitted to 979 recipients (Exhibit AY).

485

**Fax00021548-00024244-20150404:** This broadcast occurred from 4 April 2015 12:22PM until 20 May 2015 6:28PM. The image was named "Accountant \_ New1.pub", is an advertisement, and is shown in Exhibit AZ. It was successfully transmitted to 2015 recipients (Exhibit BA).

490

**Fax00024248-00026108-20150524:** This broadcast occurred from 24 May 2015 10:00AM until 9 May 2015 4:24PM. The image was named "Money Available", is an advertisement, and is shown in Exhibit BB. It was successfully transmitted to 1304 recipients (Exhibit BC).

495

**Fax00026946-00027230-20150609:** This broadcast occurred from 9 June 2015 4:32PM until 23 June 2015 11:45AM. The image was named "8 x 10 in. (1)", is an advertisement, and is shown in Exhibit BD. It was successfully transmitted to 248 recipients (Exhibit BE).

500

**Fax00027231-00027396-20150610:** This broadcast occurred from 10 June 2015 6:59PM until 23 June 2015 at 12:34PM. The image was named "Full page photo", is an advertisement, and is shown in Exhibit BF. It was successfully transmitted to 138 recipients (Exhibit BG).

505

**Fax00027399-00030095-20150613:** This broadcast occurred from 14 June 2015 11:12AM until 22 July 2015 8:48PM. The image was named "Full page photo", is an advertisement, and is shown in Exhibit BH. It was successfully transmitted to 1957 recipients (Exhibit BI).

**Fax00030096-00030147-20150705:** This broadcast occurred from 11 July 2015 4:59PM until 11 July 2015 6:30PM. The image was named "8 x 10 in. (1)", is an advertisement, and is shown in Exhibit BJ. It was successfully transmitted to 36 recipients (Exhibit BK).

510

**Fax00030149-00031434-20150705:** This broadcast occurred from 11 July 2015 6:33PM until 14 July 2015 5:38PM. The image was named "Full page photo", is an advertisement, and is shown in Exhibit BL. It was successfully transmitted to 706 recipients (Exhibit BM).

515

**Fax00033655-00034529-20150714:** This broadcast occurred from 14 July 2015 5:44PM until 16 July 2015 12:24PM. The image was named "Fax Flyer.pub", is an advertisement, and is shown in Exhibit BN. It was successfully transmitted to 648 recipients (Exhibit BO).

520

**Fax00034822-00035587-20150802:** This broadcast occurred from 2 August 2015 5:10PM until 12 August 2015 1:17PM. The image is no longer on the system but was named "Full page photo". It was successfully transmitted to 745 recipients (Exhibit BP).

525

**Fax00035591-00039080-20150812:** This broadcast occurred from 12 August 2015 1:56PM until 6 September 2015 1:01PM. The image was named "Hard Money Lending", is an advertisement, and is shown in Exhibit BQ. It was successfully transmitted to 2115 recipients (Exhibit BR).

**Fax00039083-00041984-20150820:** This broadcast occurred from 23 August 2015 6:30PM until 9

September 2015 10:59PM. The image was named “handshake - 2015.pub”, is an advertisement, and is shown in Exhibit BS. It was successfully transmitted to 2087 recipients (Exhibit BT).

530 **Fax00045477-00045982-20150911:** This broadcast occurred from 11 September 2015 6:16PM until 6 October 2015 9:03PM. The image was named “Lending Now - Commercial Mortgages”, is an advertisement, and is shown in Exhibit BU. It was successfully transmitted to 382 recipients (Exhibit BV).

535 **Fax00045984-00046626-20150918:** This broadcast occurred from 19 September 2015 11:00AM until 26 October 2015 9:26PM. The image was named “Brokers - got equity.pub”, is an advertisement, and is shown in Exhibit BW. It was successfully transmitted to 745 recipients (Exhibit BX).

540 **Fax00046627-00047132-20150923:** This broadcast occurred from 23 September 2015 9:34PM until 24 October 2015 1:21PM. The image was named “Bank - dispose.pub”, is an advertisement, and is shown in Exhibit BY. It was successfully transmitted to 748 recipients (Exhibit BZ).

545 **Fax00047133-00047639-20151027:** This broadcast occurred from 27 October 2015 6:37PM until 20 November 2015 12:45PM. The image was named “Bank - clean up.pub (Read-Only)”, is an advertisement, and is shown in Exhibit CA. It was successfully transmitted to 327 recipients (Exhibit CB).

550 **Fax00047640-00048211-20151030:** This broadcast occurred from 30 October 2015 10:01PM until 24 November 2015 7:40PM. The image was named “Brokers - Lenders Down.pub”, is an advertisement, and is shown in Exhibit CC. It was successfully transmitted to 688 recipients (Exhibit CD).

555 **Fax00048213-00050720-20151124:** This broadcast occurred from 24 November 2015 9:32PM until 19 December 2015 7:51PM. The image was named “Everyone - Thanksgiving.pub”, is an advertisement, and is shown in Exhibit CE. It was successfully transmitted to 1778 recipients (Exhibit CF).

560 **Fax00050726-00051296-20160118:** This broadcast occurred from 18 Jan 2016 5:35PM until 22 January 2016 6:52PM. The image was named “Commercial Real Estate Finance”, is an advertisement, and is shown in Exhibit CG. It was successfully transmitted to 368 recipients (Exhibit CH).

565 **Fax00051298-00051319-20160203:** This broadcast occurred from 3 February 2016 5:57PM until 5 February 2016 6:15PM. The image was named “Dental office - Immediate Occupancy.pub”, is an advertisement, and is shown in Exhibit CI. It was transmitted successfully to 32 recipients (Exhibit CJ).

**Fax00051320-00052482-20160205:** This broadcast occurred from 5 February 2016 6:16PM until 7 February 2016 7:08PM. The image is no longer on the system but was named “5200 SF Flyer.pub”. It was transmitted successfully to 683 recipients (Exhibit CK).

570 **Fax00052483-00052571-20160205:** This broadcast occurred from 7 February 2016 7:09PM until 7 February 2016 9:43PM. The image was named “Commercial Space Available”, is an advertisement, and is shown in Exhibit CL. It was transmitted successfully to 55 recipients (Exhibit CM).



575

**Fax00052574-00052613-20160219:** This broadcast occurred from 19 February 2016 6:37PM until 10 May 2016 5:44PM. The image was named “4462-boyertown Pike-.pub”, is an advertisement, and is shown in Exhibit CN. It was transmitted successfully to 36 recipients (Exhibit CO).

580

**Fax00052615-00052935-20160505:** This broadcast occurred from 5 May 2016 5:32PM until 13 May 2016 9:29PM. The image was named “Fax - Open House.pub”, is an advertisement, and is shown in Exhibit CP. It was transmitted successfully to 478 recipients (Exhibit CQ).

585

**Fax00052946-00053286-20160506:** This broadcast occurred from 6 May 2016 9:00PM until 15 May 2016 7:38PM. The image was named “5-6-2016 658 Pt Phillips K Ville.pub”, is an advertisement, and is shown in Exhibit CR. It was transmitted successfully to 515 recipients (Exhibit CS).

590

**Fax00053287-00055008-20160527:** This broadcast occurred from 27 May 2016 5:30PM until 26 June 2016 6:03PM. The image was named “Lending Now”, is an advertisement, and is shown in Exhibit CT. It was transmitted successfully to 1041 recipients (Exhibit CU).

595

**Fax00055011-00055210-20160613:** This broadcast occurred from 19 June 2016 8:52PM until 14 July 2016 8:35PM. The image was named “Lending Now”, is an advertisement, and is shown in Exhibit CV. It was transmitted successfully to 137 recipients (Exhibit CW).

**Fax00055517-00055647-20160622:** This broadcast occurred from 22 June 2016 5:46PM until 22 June 2016 8:51PM. The image was named “Accountant.pub”, is an advertisement, and is shown in Exhibit CX. It was transmitted successfully to 109 recipients (Exhibit CY).

600

Of the 54 total fax broadcasts there are images on the system for 35, and all of these are advertisements. Of the 19 broadcasts where images are not on the system 11 are named in a way that is non-generic and indicative of an advertisement (whether intrinsically or because of similarities to the names of other broadcast images where we do have the image). For the eight broadcasts where an image is no longer stored on the system and where the naming is not in itself indicative of an advertisement – it is significant that the system has no indication that it was ever used to broadcast a fax to multiple recipients which was not an advertisement. The evidence is that all of the broadcast faxes were advertisements.

605

610

The total number of faxes successfully sent through broadcasts of fax advertisements is 30,706. The total number of unique recipient fax numbers receiving broadcast fax advertisements is 2297 (Exhibit CZ). Some recipients received as many as 70 or more fax advertisements from Singer Financial in the two year period from June, 2014 to June, 2016.

615

The plaintiff in this case, KHS, uses a fax number which is identified as “Ambassador Realty” in the Singer Financial contact lists. The total number of faxes sent to the plaintiff was eight.

620

I did not examine hard drive content that was not related to the fax activity. Because I was limited to doing only what was necessary for finding the files and analyzing the fax activity I am unable to say at this time what else may or may not be on the hard drive. I kept my own research within the scope of the ActiveFax fax activity, the system registry as it concerned the fax hardware, the system registry for

the user accounts (in order to attempt to identify the user who deleted files), and examination of various contact lists (as a possible source for the fax activity). The Exhibits contain everything that I looked at.

#### FAX PROTOCOL

Fax protocol is defined and standardized in a document known as ITU T.30. T.30 describes the format of numerous binary-encoded signals which are communicated between the two endpoints in fax communication. Modems on both ends of the call are employed to modulate and demodulate data from modulations known as V.21, V.27ter, V.29, V.17, V.8, and V.34.

A complete fax consists of five different “phases”: *Phase A* involves the dialing by the caller (usually the sender) and answering by the receiver with certain expected tones. *Phase B* is an extended and negotiable handshake period where, first, the receiver announces its identification and capabilities (through signals known as NSF, CSI, and DIS); second, the caller signals its own identification and signals its intent to use a particular selection of the receiver's capabilities in transmitting one or more documents (through signals known as TSI, DCS, and TCF); and third, the receiver accepts or rejects the sender's selection (through the FTT and CFR signals). *Phase C* is the communication of a single page of image data for the document using the capabilities signaled during Phase B. *Phase D* is a post-page signal from the sender to indicate whether or not more pages are to follow (with signals MPS, EOM, or EOP) followed by a response from the receiver to either confirm receipt of the page of image data received in Phase C or to request retransmissions or retraining (with signals MCF, PPR, or RTN). If more pages follow or if retransmissions are required, then Phases B, C, and D may be repeated until completion. *Phase E* is a disconnection signal by the sender with an acknowledgment by the receiver (both DCN) followed by actual disconnection. Optional error correction mode (ECM) in fax is performed by framing the Phase C image data and including checksums for every frame. This provides the receiver with an opportunity to positively confirm that the data received was not corrupted by disturbances or noise on the communication channel (phone line).

A successful transmission of a fax page is determined by the sender's receipt of the MCF (message confirmation) signal from the receiver during Phase D. This signal indicates that the receiver acknowledges receipt of the image data and accepts it as valid per the negotiated capabilities. Attempted fax transmissions where the sender does not detect MCF communication from the receiver must be reattempted or aborted as anything other than an MCF signal must be understood to indicate a fax communication failure.

Therefore, records of successful fax transmission by the sender are sufficient to conclude that a fax transmission occurred and that the receiver had the capacity to transcribe the transmission onto paper. With this information from the sender it is superfluous and unnecessary to require evidence from the recipient in order to conclude that a fax transmission occurred.

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(Signature page follows.)

C. Lee Howard

I affirm that the preceding 14-page document dated 4 May 2017 written by me regarding KHS v Singer and all of its included exhibits are true and accurate.

Signed: C. Lee Howard  
4 May 2017



4 May 2017